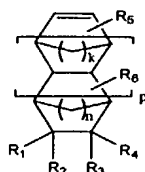


WHAT IS CLAIMED IS:

1. A photoresist copolymer derived from a mixture of monomers comprising:

(a) two or more alicyclic olefin derivatives of the formula:

<Chemical Formula 4>



wherein

k and n is independently 1 or 2;

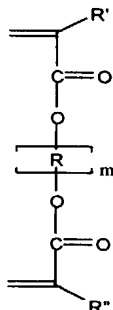
p is an integer from 0 to 5;

R₅ and R₆ are independently hydrogen or methyl; and

R₁, R₂, R₃, and R₄ individually represent hydrogen, straight or branched C₁₋₁₀ alkyl, straight or branched C₁₋₁₀ ester, straight or branched C₁₋₁₀ ketone, straight or branched C₁₋₁₀ carboxylic acid, straight or branched C₁₋₁₀ acetal, straight or branched C₁₋₁₀ alkyl including at least one hydroxyl group, straight or branched C₁₋₁₀ ester including at least one hydroxyl group, straight or branched C₁₋₁₀ ketone including at least one hydroxyl group, straight or branched C₁₋₁₀ carboxylic acid including at least one hydroxyl group, and straight or branched C₁₋₁₀ acetal including at least one hydroxyl group,

wherein, at least one of R₁, R₂, R₃, and R₄ represent straight or branched C₁₋₁₀ alkyl including at least one hydroxyl group, straight or branched C₁₋₁₀ ester including at least one hydroxyl group, straight or branched C₁₋₁₀ ketone including at least one hydroxyl group, straight or branched C₁₋₁₀ carboxylic group including at least one hydroxyl group, straight or branched C₁₋₁₀ acetal including at least one hydroxyl group; and

(b) a cross-linking monomer of the formula:

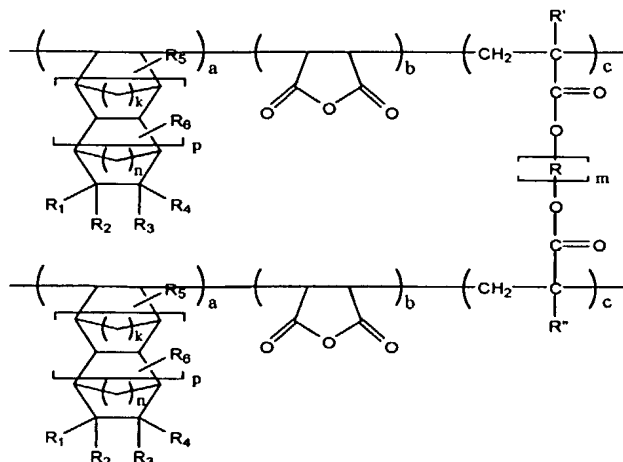


25 wherein
 26 each of R' and R'' is independently hydrogen or methyl;
 27 m is an integer from 1 to 10; and
 28 R is straight or branched C₁₋₁₀ alkyl, optionally comprising an ester, a
 29 ketone, a carboxylic acid, an acetal, a hydroxyl group or a combination thereof.

1 2. The photoresist copolymer according to claim 1, wherein said
 2 mixture of monomers further comprises maleic anhydride.

1 3. The photoresist copolymer according to claim 1 of the formula:

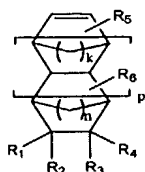
2 <Chemical Formula 5>



3
 4 wherein
 5 k, m, n, p, R, R₁, R₂, R₃, R₄, R₅, R₆, R', and R'' are those defined in Claim 1; and the ratio
 6 a : b : c is 1-50 mol% : 10-50 mol% : 0.1-20 mol%.

1 4. The photoresist polymer according to claim 3 comprising
 2 poly(maleic anhydride / 2-hydroxyethyl 5-norbornene-2-carboxylate / tert-butyl 5-
 3 norbornene-2-carboxylate / 5-norbornene-2-carboxylic acid / 1,3-butanediol diacrylate);
 4 or poly(maleic anhydride / 2-hydroxyethyl 5-norbornene-2-carboxylate / tert-butyl 5-
 5 norbornene-2-carboxylate / 5-norbornene-2-carboxylic acid / 1,4-butanediol diacrylate).

1 5. A process for preparing a photoresist copolymer comprising
 2 admixing at least two alicyclic monomers, a cross-linking monomer and a polymerization
 3 initiator under polymerization reaction conditions sufficient to produce the photoresist
 4 copolymer, wherein the alicyclic monomer is of the formula:



wherein

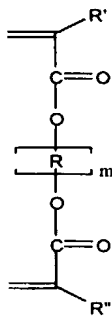
k and n is independently 1 or 2;

p is an integer from 0 to 5;

R₅ and R₆ are independently hydrogen or methyl; and

R₁, R₂, R₃, and R₄ individually represent hydrogen, straight or branched C₁₋₁₀ alkyl, straight or branched C₁₋₁₀ ester, straight or branched C₁₋₁₀ ketone, straight or branched C₁₋₁₀ carboxylic acid, straight or branched C₁₋₁₀ acetal, straight or branched C₁₋₁₀ alkyl including at least one hydroxyl group, straight or branched C₁₋₁₀ ester including at least one hydroxyl group, straight or branched C₁₋₁₀ ketone including at least one hydroxyl group, straight or branched C₁₋₁₀ carboxylic acid including at least one hydroxyl group, and straight or branched C₁₋₁₀ acetal including at least one hydroxyl group,

wherein, at least one of R₁, R₂, R₃, and R₄ represent straight or branched C₁₋₁₀ alkyl including at least one hydroxyl group, straight or branched C₁₋₁₀ ester including at least one hydroxyl group, straight or branched C₁₋₁₀ ketone including at least one hydroxyl group, straight or branched C₁₋₁₀ carboxylic group including at least one hydroxyl group, straight or branched C₁₋₁₀ acetal including at least one hydroxyl group; and the cross-linking monomer is of the formula:



wherein

each of R' and R'' is independently hydrogen or methyl;

m is an integer from 1 to 10; and

R is straight or branched C₁₋₁₀ alkyl, optionally comprising an ester, a ketone, a carboxylic acid, an acetal, a hydroxyl group or a combination thereof.

- 1 6. The process for preparing a photoresist copolymer according to
2 claim 5, wherein the polymerization reaction is carried out under an atmosphere of
3 nitrogen or argon.
- 1 7. The process for preparing a photoresist copolymer according to
2 claim 5, wherein the polymerization reaction is carried out at a temperature between 60°C
3 and 130°C.
- 1 8. The process for preparing a photoresist copolymer according to
2 claim 5, wherein the polymerization reaction is carried out under the pressure between
3 0.0001 and 5 atm.
- 1 9. The process for preparing a photoresist copolymer according to
2 claim 5, wherein the admixture further comprises an organic solvent selected from the
3 group consisting of cyclohexanone, methyl ethyl ketone, benzene, toluene, dioxane,
4 tetrahydrofuran, propylene glycol methyl ether acetate, dimethylformamide, and a
5 mixture thereof.
- 1 10. The process for preparing a photoresist copolymer according to
2 claim 5, wherein the polymerization initiator is one or more compound(s) selected from
3 the group consisting of 2,2-azobisisobutyronitrile (AIBN), acetyl peroxide, lauryl
4 peroxide, tert-butyl peracetate, tert-butyl hydroperacetate and tert-butyl peroxide.
- 1 11. The photoresist composition comprising (i) a photoresist
2 copolymer according to claim 1, and (ii) an organic solvent.
- 1 12. The photoresist composition according to claim 11, which further
2 comprises a photoacid generator.
- 1 13. The photoresist composition according to claim 12, wherein the
2 photoacid generator is one or more compound(s) selected from the group consisting of
3 diphenyl iodide hexafluorophosphate, diphenyl iodide hexafluoroarsenate, diphenyl
4 iodide hexafluoroantimonate, diphenyl p-methoxyphenyl triflate, diphenyl p-toluenyl
5 triflate, diphenyl p-isobutylphenyl triflate, diphenyl p-tert-butylphenyl triflate,
6 triphenylsulfonium hexafluorophosphate, triphenylsulfonium hexafluoroarsenate,

